CLAIMS:

1.   A pumping system for pumping an oral composition used in the treatment of the oral cavity, comprising:

        a pumping system for moving an oral composition useful in the treatment of the oral cavity having a selected viscosity from a reservoir of an oral treatment system to an outlet of the system, the pumping system including a pump and a fluid pathway for the oral composition to reach the outlet, wherein the pump is so characterized and the pathway has an internal cross-sectional area (A) within the range of 0.25 mm^2-16 mm^2 and a length (y) within the range of 100 mm-200 mm and is otherwise so characterized by such a cross-sectional shape and cross-sectional uniformity along its length that an oral composition with a minimum viscosity of 10 Pa.s at a shear rate of 1s^{-1} and a maximum viscosity not greater than η(in Pa.s) at a shear rate γ(in s^{-1}) defined as follows:

$$\eta = \frac{250A^2}{4y} \text{ and } \gamma = \frac{2500}{A^{3/2}}$$

can be moved to the outlet by the pump at a rate of at least 0.1 ml per second.

2.   The pumping system of claim 1, wherein said rate is preferably approximately 0.2 ml per second.

3.   The pumping system of claim 1, wherein the fluid pathways are flexible tubing and the internal cross-sectional area of the tubing is within the range of 0.5 mm^2 to 10 mm^2 and the length of the tubing is from 120 mm to 180 mm.

4.   The pumping system of claim 1, wherein the pump is a positive displacement pump.

5.   The pumping system of claim 1, wherein the oral treatment system comprises a hand-held toothbrush which includes a housing grippable by a user's hand, wherein the housing contains the reservoir.

6.   The pumping system of claim 5, wherein the toothbrush is an electric toothbrush.

7.   The pumping system of claim 4, wherein the positive displacement pump is a diaphragm pump.

8.   The pumping system of claim 1, wherein the reservoir has an internal volume of between 5 ml and 25 ml.

9.   The pumping system of claim 3, wherein the tubing has a length to internal cross-section area ratio of at least 1:1 ml^{-1}.

10.   A system for treatment of the oral cavity, comprising:

an oral composition suitable for treatment of the oral cavity;

a reservoir for the oral composition; and

a pumping system for moving the oral composition from the reservoir to an outlet of the treatment system, the pumping system including a pump member and a fluid pathway tube for the oral composition to reach the outlet, wherein the pump is so characterized and the fluid pathway tube has a cross-sectional area (A) within the range of 0.25 mm² to 16 mm² and a length (y) within the range of 100 mm-200 mm and otherwise so characterized by a selected cross-sectional shape and uniformity of cross-sectional configuration along its length relative to the oral composition with a minimum viscosity of 10 Pa.s and a shear rate of 1s⁻¹ and a viscosity not greater than η(in Pa.s) at a shear rate γ(in s⁻¹), defined in the following equations:

$$\eta = \frac{250A^2}{4Y} \quad and \quad \gamma = \frac{2500}{A^{3/2}}$$

that said composition can be moved to the outlet by the pump at a flow rate of at least 0.1 ml per second.

11.   The system of claim 10, wherein the fluid pathway tube has an internal cross-sectional area within the range of 0.5 mm² to 10 mm² and a length within the range of 120 mm to 180 mm.

12.   The system of claim 10, wherein the reservoir has an internal volume of between 5 ml and 25 ml.

13.   The system of claim 10, wherein the flow rate is preferably 0.2 ml per second.

14.   The system of claim 10, wherein the oral treatment system includes a hand-held toothbrush which can be gripped in the user's hand, wherein the housing contains the reservoir and the outlet is within a bristle portion of the toothbrush.

15.   A method of treatment of the oral cavity, comprising the steps of:

moving an oral composition suitable for treatment of the oral cavity with a pumping system from a reservoir to an outlet of an oral treatment system, the oral treatment system comprising a toothbrush having a brushhead with an outlet suitable for insertion into the oral cavity, the pumping system including a pump and a fluid pathway tube for an oral treatment composition, wherein the pump is so characterized and the fluid pathway tube has an internal cross-section diameter (A) within the range of 0.25 mm² to 16 mm² and a length (Y) within the range of 100 mm to 200 mm and is otherwise so characterized by a cross-sectional shape and uniformity of cross-sectional configuration that the oral

composition is moved to the outlet at a flow rate of at least 0.1 ml per second, wherein the oral composition has a minimum viscosity of 10 Pa.s and a shear rate of 1 s⁻¹ and a maximum viscosity not greater than η(in Pa.s) at a shear rate γ (in s⁻¹), defined by the following equation

$$\eta = \frac{250A^2}{4Y} \text{ and } \gamma = \frac{2500}{A^{3/2}}$$

16.   The treatment method of claim 15, wherein said flow rate is approximately 0.2 ml per second.

17.   The treatment method of claim 15, wherein the reservoir has an internal volume of between 5 ml and 25 ml.

18.   The treatment method of claim 15, wherein the fluid pathway has a cross-sectional area within the range of 5 mm² to 10 mm² and a length within the range of 120 mm to 180 mm.